Important PEARLS for PALS

Pediatric BLS, Defibrillation. Cardioversion

Chest compressions are done with cycles of five compressions and one ventilation when a child's heart rate Is < 60 bprn and per-fusion is poor.

The carotid pulse is used for determining if circulation is present in a child.

AED's can be used in children >/= 8 years of age and weigh >/= 25 kg. This can offer the greatest chance to improve survival in a child who suddenly becomes apneic and pulseless.

When finding an apparently unresponsive child, the first action would be to determine if there is in fact, unresponsiveness. The method of determining responsiveness should be chosen with potential trauma in mind, using care for the cervical spine.

After determining unresponsiveness, the next step is to shout for help and begin the ABC's by opening the airway and checking for breathing.

When multiple rescuers are available, CPR and phoning for help can be conducted simultaneously. You do not need to choose between "phone first" and "CPR first"

Complete FBO in a conscious patient is treated by abdominal thrusts in children over 1 year and back blows and chest thrusts in infants less than 1 year.

Chest compressions for a child should be at a rate of approximately 100/minute at a depth of 1/2 to 1/3 the depth of the chest.

When suspecting a FBO in a conscious child, always start by asking 'Are you choking?" and "Can you speak?"

Healthcare providers should do a pulse check on an apneic patient after giving two rescue breaths, as well as checking for response to the two breaths, coughing and movement.

Airway management and BVM

A child who is alert, with clear and adequate breath sounds with some difficulties in breathing i.e. mild stridor. should get supplemental humidified oxygen and be reevaluated. Allow the child to remain with parent / caretaker in a comfortable position.

An infant or child who is in respiratory failure, with acute signs and symptoms such as decreased respirations, requires immediate and aggressive support via bag valve mask and 1 00% oxygen. Ongoing assessment is also needed.

When a child on a ventilator suddenly deteriorates, attempt BVM. If breath sounds are unequal but present, the most likely cause is displacement. (DOPE mnemonic)

BVM may be as effective as intubation when transport times are short.

A nonrebreathing face mask with an oxygen reservoir will deliver high concentrations (90% or >) of inspired oxygen.

Asthma patients that start out tachypneic and then develop slow respirations and decreased level of consciousness, probably developed hypoxia, hypercarbia and muscle fatigue, the typical clinical consequences of progressive respiratory failure caused by asthma.

During intubation, the patient's condition should be monitored and the attempt should be interrupted if it deteriorates. BVM ventilation with 100% oxygen should be done at that time.

Secondary confirmation of tracheal intubation is most reliably done with end tidal CO_2 - detection after delivery of six positive pressure breaths.

Methods of determining appropriate tube size for children include length based tapes, measuring the tube against the pinkie, and for children over 1 year using the formula (age + 16)/4 or (age in years /4) +4

In the apneic patient, the most appropriate method for tracheal intubation after receiving 100% 02 via BVM, is orotracheal intubation.

Respiratory Failure

The most common cause of cardiac arrest in children is a respiratory problem or respiratory arrest. The progression is often hypoxia to respiratory arrest. bradycardia and then asystolic cardiac arrest.

In a child with known respiratory ailments, slow respirations after tachypnea are evidence of respiratory failure.

For tension pneumothorax that 'is compromising cardiovascular function of the patient, immedl'ate intervention with needle decompression and then a chest/thoraccstomy tube is required. Signs and symptoms of tension pneumothorax include a rapid respiratory rate. deviated trachea and a low pulse oximetry reading.

Shock

Compensated shock.- no significant hypotension in a patient with inadequate tissue perfusion. Decompensated shock is shock with hypotension. Minimal systolic BP is 70 + 2 x age In years. If BP is lower than this, then child is hypotensive.

For decompensated shock, after administering 100% oxygen and obtaining vascular access, administration of a crystalloid fluid bolus i's your next action.

Most common cause of shock in children is hypovolemic shock, which can be from a history of diarrhea, vomiting or trauma.

Initial therapy for poor perfusion is- open the airway, 100% 02. IV access, and bolus of 20 ml/kg of isotonic solution in less than 20 minutes.

Even if the existing catheter for IV access is small, it can be used during a resuscitation for medication and fluids until a larger catheter is inserted.

Trauma

Initial support of an unresponsive trauma victim with possibility of C-spine injury is to open the airway via the jaw thrust and maintain cervical spinal immobilization. After the airway is open. and clear of potential obstructions, assisted ventilations should be provided. Intubation of the trachea can be done after this.

When establishing responsiveness after trauma, do not cause unnecessary motion of the cervical spine. For trauma patients, volume expansion with crystalloid solutions is done. After 2 or 3 boluses, packed red blood cells can be administered.

Initial support of systemic perfusion requires control of external hemorrhage by direct pressure. Continued evaluation includes assessment of the severity of the bleeding and evaluation of the distal pulses.

In the US, injury, with a high percentage coming from motor vehicle collisions. is the leading cause of death in the pediatric population over 6 months. Trauma is responsible for more deaths than all childhood diseases combined.

Unwitnessed submersion injuries should be treated as a potential trauma. All submersion victims need immediate rescue breathing if they are not breathing on their own. Once the airway is opened with C-spine precautions, give two rescue breaths if not breathing adequately.

CardiiopulmonarV Arrest and RhVthm Disturbances

Initial cardloversion dose is 0 .5 – 1 J/kg followed by 1-2 J/kg.

SVT- HR >220 for infant, 180 for child. If patient is stable, then attempt vagal maneuvers first. Establish IV and administer adenosine if not successful. If patient shows signs of being unstable, cardioversion or adenosine are the treatments of choice, whichever can be delivered more rapidly. Adenosine is administered via the 2-syringe technique.

Most common cause of cardiopulmonary arrest in infants and children is deterioration in respiratory and circulatory function.

Defib: 1st. shock - 2 joules/kg, repeat at 4 joules/kg. then 4 joules/kg. Defib is first priority for V-fib/ pulseless V-tach rhythms. Recommended sequence for refractory VF is CPR - drug - shock. Defib should be attempted within 30 - 60 seconds after each dose of medication. If VF continues after a 4 th shock, consider antiarrhythmics while continuing epi every 3 - 5 minutes.

After the first 3 shocks for vfib arrest, the sequence is CPR, drug, shock, drug, shock. The first round drug, is epi, and the next round drug is an antiarrythmic.

First line drug for bradycardia or asystole rhythms is epinephrine. The initial IV/10 dose is 0. 1 ml/kg of 1 - 1 0,000 solution. Initial tracheal dose is ten times higher, or .01 ml/kg of 1 - 1,000 solution.

Defib- paddle size: largest size that allows good chest contact over entire paddle surface with good separation between the 2 paddles.

- infant paddles used for up to I year or 10 kg, after that use adult paddles.

Primary cardiac events, while rare in children, do occur. With sudden cardiac arrest, the most likely rhythm is vfib/pulseless vtach and immediate defibrillation is the treatment of choice,

Postresuscitation care of the critically ill pediatric patient, should include frequent reassessment and needed treatment to support cardiopulmonary function.

Vagal maneuvers include ice to the face and blowing into an occluded straw.

In cardiac arrest, after treating airway with good ventilation and oxygen (and administering epinephrine), always consider potentially reversible causes.

Lidocaine (1 mg/kg) or amiodarone (5 mg/kg) may successfully treat pulseless VT because they decrease automaticity and may suppress ventricular ectopy. They may be administered after three shocks, epi and a 4th. shock are unsuccessful.

The effects of epi are many and variable – both alpha and beta effects. Epi increases peripheral vascular resistance and may stimulate cardiac activity where none is present. It is inotrophic, chronotrophic and dromotrophic and increases myocardial oxygen demand. Epi increases cerebral per-fusion and cardiac automaticity.

Potential reversible causes of PEA are hypoxemia, hypovolemia, hypothermia, hyperkalemia, hypokalemia and; tamponade, tension pneumothorax, toxin/drug ingestion and thromboembolism (4 H's and 4 T's). Always attempt to identify and treat reversible causes.

The most appropriate option for transporting critically ill pediatric patients from a community hospital to a tertiary center is a pediatric critical care transport team

Vascular Access

Some indications that an IO has been placed correctly are when the resistance to insertion suddenly decreases, the needle stands firmly in the bone, and when fluids can be pushed freely without any local soft tissue swelling.

The preferred route for medication administration is IV over ETT. If you have a patent IV it is best to use it for initial med or fluid administration even if it is a small catheter.

If IV access is not established on initial attempts with a pulseless child, the most appropriate next action is to establish intraosseous access.

Toxicology

When assessing children who have taken overdoses, always first assess airway. respiratory rate, air movement and color of skin and mucous membranes.

Poisoning and overdose cause large numbers of hospital visits, and in the older pediatric population significant mortality.